

1 STATE OF LOUISIANA

2
3 DEPARTMENT OF NATURAL RESOURCES

4
5 OFFICE OF CONSERVATION

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9 IN RE: Sterling Sugars, Inc.

10
11 Versus

12
13 Amerada Hess Corporation

14
15 Docket No. ENV-L-2015-02

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14
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17
18
19
20
21
22
23
24
25

INDEX OF VOLUME 2	PAGE
OPENING COMMENTS OF MR. BALHOFF	281
TESTIMONY OF GEORGE JOSEPH CASTILLE III	282
DIRECT EXAMINATION BY MS. WHEELER:	282
VOIR DIRE EXAMINATION BY MR. HUDDALL:	290
JOHN R. FRAZIER, PH.D. OFFERED AND	291
ACCEPTED AS AN EXPERT IN THE AREA OF	
HEALTH PHYSICS AND RADIATION SAFETY	
EXAMINATION OF JOHN R. FRAZIER, PH.D. RESUMED ...	291
DIRECT EXAMINATION RESUMED BY MS. WHEELER: ...	291
CROSS EXAMINATION BY MR. HUDDALL:	323
REDIRECT EXAMINATION BY MS. WHEELER:	331
TESTIMONY OF GEORGE JOSEPH CASTILLE III	332
DIRECT EXAMINATION BY MR. ARNOLD:	332
GEORGE J. CASTILLE, III, PH.D. OFFERED	345
AND ACCEPTED AS AN EXPERT IN HISTORICAL	
GEOGRAPHY AND AERIAL PHOTO	
INTERPRETATION AND ANALYSIS OF	
HISTORICAL MAPS	
DIRECT EXAMINATION OF DR. CASTILLE RESUMED	345
DIRECT EXAMINATION RESUMED BY MR. ARNOLD:	346
REPORTER'S CERTIFICATE	368

1 THE HEARING OFFICER: Okay. We're going to
2 go on the record.

3 Good morning.

4 Let me mention this about these updated
5 exhibit lists I'm getting.

6 By the time we get to the final day, I
7 want to make sure that both sides agree with
8 each other's list, and I want you to mark
9 this document, on each side, as whatever your
10 last Exhibit Number is. So that when this
11 record is referred to or briefs are written,
12 or written reasons come from the panel, they
13 can find a list and refer to the list.
14 That's just, that's just for ease of this
15 proceeding. Okay?

16 It's my understanding from talking to
17 Mr. Cash and Mr. Jones -- and I'm not holding
18 you to anything -- but it's my understanding
19 that today is going to be a short day. Is
20 that correct?

21 MR. CASH: We believe, yes.

22 MR. JONES: We do believe so.

23 THE HEARING OFFICER: Okay. I mentioned to
24 the panelists and to the court reporter that
25 at least your projection is by noon. The

1 court reporter has advised I think the other
2 court reporter not to come.

3 If for some reason during the
4 proceedings this morning things change, let
5 me know so we can change that. Okay?

6 Having said that, let's start and turn
7 to Hess for their next witness, please.

8 MS. WHEELER: All right.

9 Good morning, Panel and Mr. Balhoff. We
10 would like to call Dr. John Frazier to the
11 stand.

12 WHEREUPON, JOHN RONALD FRAZIER, PH.D.,
13 having been duly sworn, testified as
14 follows:

15 THE HEARING OFFICER: Before you start,
16 Dr. Frazier, I've told people here before --
17 I think you and I know each other, I've told
18 you this before -- I'm hearing-impaired, so
19 I've got hearing aids in, but, you know,
20 speak up.

21 THE WITNESS: I will.

22 THE HEARING OFFICER: Okay. Great.

23 DIRECT EXAMINATION

24 BY MS. WHEELER:

25 Q. Dr. Frazier, would you state your name and

1 address for the record.

2 A. John Ronald Frazier, 325 Sugarwood Drive,
3 Knoxville, Tennessee 37934.

4 Q. Okay. What were you retained by Hess to do
5 in this case?

6 A. To perform a radiological characterization of
7 this property, a radiological site characterization of
8 the property.

9 Q. All right. And based upon that evaluation, I
10 understand that you assisted in coauthoring the GHD
11 Plan for Soil Remediation insofar as it relates to NORM
12 that's being presented this week to the panel; is that
13 correct?

14 A. Yes. The portions of the plan that relate to
15 naturally occurring radioactive material are
16 technologically enhanced NORM.

17 Q. And what is your expertise, Dr. Frazier?

18 A. I'm a health physicist. Radiation safety is
19 my profession. All my years of experience are in that.
20 I don't give opinions on things outside of the range of
21 radionuclides and radiation, stuff like that.

22 Q. So what kind of things are included in the
23 ambit of health physics?

24 A. Well, it's radiation detection and
25 measurement; site characterization; collection, and

1 analysis of environmental samples. I really enjoy
2 doing the review of environmental data, sort of a data
3 geek in that regard; but also assessing radiation
4 doses, both internal and external radiation doses from
5 radioactive materials; and putting radiation doses in
6 perspective with respect to natural background
7 radiation doses.

8 Q. Dr. Frazier, I want the panel to understand
9 how eminently qualified you are to talk about these
10 issues.

11 Can you give them a little bit of background
12 about your education?

13 A. Well, I have a bachelor's, a master's, and
14 Ph.D. in physics from the UT -- Tennessee, not Texas --
15 the master's and Ph.D. from Tennessee.

16 The Ph.D. in physics had an emphasis in
17 health physics; did my research at Oak Ridge National
18 Laboratory. And part of that funding was from the
19 Atomic Energy Commission on a fellowship in health
20 physics and radiation protection.

21 I got interested in radiation detection and
22 measurements when I was a 19-year-old sophomore at
23 undergraduate school, where I was a physics major. And
24 ever since then, that's been one of my great interests,
25 is detection and measurement and the interpretation of

1 data.

2 Q. Dr. Frazier, if you don't mind flipping to
3 the next slide, because it does have some bullet points
4 about the points we're talking about, your
5 qualifications.

6 I would like the panel to understand that you
7 have been working in the field of health physics for
8 about 37 years. Can you tell them kind of your work
9 experience?

10 A. Yes. That's 37 years of professional
11 experience. That doesn't count for time in school,
12 which seemed like forever.

13 But the first job I had out of -- after I got
14 my Ph.D. was with the U.S. Food and Drug
15 Administration. And there I was responsible for
16 instrument calibration, use of instruments, radiation
17 detection instruments, used by the FDA inspectors.

18 Also there I was responsible for the external
19 dosimetry system, measuring external doses associated
20 with medical procedures. And during that time, I was
21 called upon to assist in the radiation dose
22 assessment -- external dose assessment around Three
23 Mile Island following that incident -- accident.

24 In addition to the time there, following that
25 I came to Oak Ridge, associated universities at Oak

1 Ridge, and there I coordinated the health physics
2 training and taught many of the courses there. I
3 taught many of the Louisiana state employees there that
4 came to the short courses. Courses were anywhere from
5 two days to ten weeks long; and teach the basic
6 concepts and advanced concepts of health physics and
7 radiation safety.

8 Following those six years, I worked as a
9 consultant for seven years with IT Corporation,
10 consulting on issues regarding radiation -- let's see,
11 environmental site characterization, radiation dose
12 assessments. Part of that time I was responsible for a
13 Superfund risk assessment. I was the manager of the
14 Superfund risk assessment for the Frenal (phonetic)
15 site under CERCLA. That was about three or four years
16 I did that.

17 Then following that I joined Auxier &
18 Associates as a consultant with them.

19 And then for the last 11 years, I've been
20 independently employed, self-employed, as a health
21 physics consultant; again doing most anything having to
22 do with radiation detection, measurement,
23 interpretation of data, collection of samples.

24 I've published in numerous areas. Most of
25 those have been project-related documents though.

1 The peer-reviewed documents that I have
2 published are listed in my CV, and they are mostly
3 associated with the National Council on Radiation
4 Protection and Measurement, NCRP.

5 I am the -- one of their words here -- I'm
6 what they call a Distinguished Emeritus Member. I
7 think that means I'm old -- member of the NCRP.

8 The NCRP is an organization of a hundred
9 scientists and engineers and physicians. It's
10 chartered by Congress to make recommendations to
11 Congress and the President on matters related to
12 radiation sources, radiation doses, and effects of
13 radiation. I served two six-year terms as an elected
14 member of the council, and then after that I was
15 elected as emeritus -- distinguished emeritus member.

16 I've advised other federal agencies on health
17 physics and radiation protection topics: The NC --
18 Nuclear Regulatory Commission, and the U.S.
19 Environmental Protection Agency. The -- and others.
20 The Department of Energy, actually assisted them on
21 several cases, projects.

22 One of the more interesting projects I worked
23 on was advising the Peace Corps of the United States.
24 When the -- with the fall of the former Soviet Union,
25 they wanted to send employees, Peace Corps volunteers,

1 into these various former countries of the Soviet
2 Union, and I was on an advisory panel regarding the
3 potential radiation doses, potential exposures, people
4 might get from that.

5 Other things that go along with that, years
6 experience, it's a wide range of things. I was called
7 upon to assist following the Fukushima accident in
8 characterizing some of the radiation contamination
9 events; and also in going into South Korea to interpret
10 the data for the products imported from Japan, what the
11 data show.

12 Q. Dr. Frazier, I understand, in addition to
13 doing -- kind of being the go-to person for all these
14 events around the world and talking and advising the
15 nation on nuclear issues, let's go down to a more
16 statewide level.

17 I understand you've done a lot of work
18 evaluating, from a radiological assessment, Louisiana
19 oilfield properties. Is that correct?

20 A. Yes. Over the past several years, I've
21 assessed radiological conditions on many properties in
22 Louisiana. Some of them are clearly NORM-impacted;
23 some of them are not. Some have NORM-impacted
24 groundwater; some do not. But I've done several oil
25 and gas-related sites in Louisiana.

1 Q. And, Dr. Frazier, I understand you've been
2 accepted as an expert in health physicists, or an
3 expert in health physicists by Louisiana state and
4 federal courts, and in addition by the LDNR in
5 connection with several Act 312 proceedings. Is that
6 right?

7 A. Well, two other Act 312 proceedings, as I
8 recall.

9 Q. Okay.

10 A. Savoie was one, and I think Tensas Poppadoc
11 was another one. I think we actually met in that other
12 room over there for those two hearings at that time.

13 MS. WHEELER: All right. I would like to
14 note for the panel that Dr. Frazier's updated
15 CV is attached as Exhibit 14. It's in your
16 booklet at Tab 6, so you can see all of his
17 credentials.

18 And at this point, based upon his
19 extensive experience, training, and
20 education, I would ask that Dr. Frazier be
21 admitted as an expert in the area of health
22 physics and radiation safety.

23 THE HEARING OFFICER: Are you going to ask
24 any voir dire questions?

25 MS. DASCHBACH: Just one, one question.

VOIR DIRE EXAMINATION

BY MR. HUDDALL:

Q. You haven't been asked to look at the ecological -- potential ecological impacts that NORM might pose in this case; right?

A. I was not asked to perform an ecological risk assessment, but I was asked to look at the radiation doses that could be received by ecological receptors and see whether those would have presented an adverse effect, yes.

Q. But you haven't taken the steps it would take to determine whether there's an ecological risk at this site; correct? You weren't asked to do that?

A. I wasn't asked to do a formal ecological risk assessment. I was asked to evaluate the potential radiation doses from the materials.

MR. HUDDALL: With that, no objection.

THE HEARING OFFICER: I'm sorry?

MR. HUDDALL: No objection to his qualification.

THE HEARING OFFICER: Look, before we start -- since I'm not a professional judge, I forget these things -- you know you're here to tell the truth.

Oh, did you, I have must missed it. I'm

1 sorry, I apologize.

2 THE WITNESS: I said I do.

3 THE HEARING OFFICER: Okay. Ms. Wheeler.

4 MS. WHEELER: So he is accepted?

5 THE HEARING OFFICER: He's accepted.

6 BY MS. WHEELER:

7 Q. Okay. What I would like to do now,
8 Dr. Frazier, is kind of do a 101 on a NORM overview. I
9 know our panel members might have some background in
10 NORM. But I think it would be helpful if we just kind
11 of walk through it.

12 MS. WHEELER: If at any point you-all feel
13 like this is too elementary, let us know and
14 we can kind of skip and go directly to the
15 site investigation, but I think this might be
16 helpful.

17 BY MS. WHEELER:

18 Q. So, Dr. Frazier, if you would, just kind of
19 start --

20 A. And again, if I get too basic, just tell me
21 to move on. Okay?

22 All matter is made up of atoms. Some atoms
23 have nuclei that have too much mass or energy and they
24 undergo radioactive decay. Those are called
25 radioactive materials.

1 We have all kinds of radioactive materials in
2 the environment naturally-occurring, and the acronym
3 for natural-occurring radioactive material is NORM,
4 N-O-R-M.

5 We can also have technologically enhanced
6 NORM, or TENORM. And this would be the radioactive
7 material that, through human activities is either
8 brought to a different location or maybe even
9 concentrated. In the case of oil and gas production,
10 we have a concentration that is inadvertent, not
11 deliberate, but inadvertent, and we bring the
12 material -- NORM is brought from formation locations up
13 to the surface.

14 Those radionuclides that we find in the earth
15 are part of three primary series. These are primordial
16 series. In fact, it's kind of interesting. Someone
17 asked me the other day, he said, "Why are these very
18 important?"

19 If it weren't for these suckers being down in
20 the middle of the earth, we wouldn't have a molten
21 center of the earth, because the radioactive decay is
22 what keeps the earth center molten.

23 The uranium decay series has a whole range of
24 alpha emitters, beta emitters, and gamma emitters. The
25 thorium decay series has a whole range. And then the

1 actinium series is probably one you may have heard
2 about because it has the uranium-235 in it. It has
3 decayed some compared to the other two.

4 The uranium and thorium series are at about
5 the same activity concentration in the earth's surface.

6 We have some other radio -- natural-occurring
7 radioactive materials. You may not be aware of it, but
8 potassium-40 is the most abundant radioactive material
9 in your body. In fact, we have over 10,000 picocuries
10 of potassium-40 in our bodies, depending on how much we
11 weigh. But -- and our body maintains the potassium
12 levels through the electrolyte-balance process.

13 But these are naturally occurring materials
14 in the earth.

15 The radionuclides of interest are the radium,
16 226 and 228. They are present throughout the earth,
17 present at very trace amounts by mass. They are truly
18 a trace metal, very small mass amounts.

19 But the chemical properties are similar to
20 calcium and especially barium. And they are of
21 interest as a source of radiation dose. Both
22 radium-226 and -228 decay to other short-lived
23 radionuclides that give potential external dose and an
24 internal dose.

25 There are other radiation sources in addition

1 to these radioactive materials. The radiation,
2 radioactive materials -- whoops, go back here -- that I
3 just mentioned, those are the terrestrial sources.

4 We also have cosmic radiation from space,
5 primarily very, ultra high-energy protons, zipping
6 through space -- hydrogen nucleides, zipping through
7 space. By the time they get down to us, they end up
8 being like gamma rays. They -- through multiple
9 collisions.

10 These cosmic radiations would be the concern
11 for folks who would be traveling on long space
12 missions, likely to be close to a lethal dose.

13 But down on the earth, we're protected by the
14 shielding of the atmosphere. If we have -- if we live
15 at a higher elevation, our cosmic radiation dose is
16 much higher.

17 There are also radionuclides inside our
18 bodies. I mentioned the potassium-40. That's the main
19 one, gives us a radiation dose from that.

20 And you've heard of radon and radon progeny.
21 That's their daughters. And those are the ones that --
22 radon we usually refer to as the radon-222, which is
23 the radium-226 daughter. That gives us a pretty
24 significant radiation dose.

25 Especially if you have a very tightly sealed

1 home with an opening to the soil beneath it, that's how
2 you trap that radon in there. You don't get it from
3 distant sources, but you get it from right near your
4 home there.

5 And there are some places in the United
6 States that very have high levels of radon. Up in
7 eastern Pennsylvania is one example. And in fact,
8 hazardous levels of radon.

9 Man has always lived in the presence of
10 naturally occurring radioactive material. And, in
11 fact, we live in a virtual sea of natural background
12 radiation. Usually I bring in -- for a demonstration
13 like this, I bring in a radiation detector, a gamma
14 detector and turn it on. You can hear it screaming
15 about -- in here it would be about 1200 counts a
16 minute, or maybe even with a bigger detector, probably
17 6- or 7,000 counts per minute.

18 But we just don't detect it. We can't detect
19 it with our senses. But we are around that. And man
20 has always lived in this radiation field.

21 The radionuclides of importance for oilfield
22 NORM. If we look at the uranium series -- if we look
23 at the uranium series, we have these radionuclides that
24 sequentially decay, series decay. And within that
25 series -- these are all different elements, of

1 course -- you've got uranium, thorium, protactinium,
2 and down to radium here.

3 Of these radionuclides in the series, the
4 radium is the more soluble.

5 If you put high chloride levels around radium
6 in rock or soil, it will cause some of that radium to
7 come out into that chloride water especially as a
8 radium chloride. And so it's more mobile as a
9 chloride. And this is the process by which you have
10 the radium-226 actually going into the produced water
11 down in the ground. The produced water is very salty,
12 the formations from which the water is extracted.

13 Similarly for the thorium series, the
14 radium-228 here, coming down you see that it's the
15 element that is the most soluble here. And also
16 radium-224, but it's very short half-life there. So
17 it's 226 and 228.

18 You will notice the half-life here of the 228
19 and the half-life of 226.

20 Okay? And we start off with about equal
21 amounts of this, these two radionuclides, in the
22 produced water.

23 Now, there are many operations that generate
24 radium, especially as the TENORM, the technologically
25 enhanced NORM.

1 Purification of drinking water: When you
2 remove the solids for our drinking water, you're
3 removing the radium. The radium is an one or more
4 chemical forms in the water; and when you remove that
5 through precipitation or flocculation, you're bringing
6 out the radium. The waste from that are very similar
7 to what we have from oil production, produced water
8 waste.

9 Also, you have radium from the production of
10 phosphate fertilizer. Phospho-gypsum, the radium goes
11 with the phospho-gypsum. Uranium goes with the
12 phosphoric acid. An attraction of rare earth elements.
13 There we have radium-228 especially in the thorium
14 series. Elemental phosphor production and other, other
15 examples of radionuclides, mostly -- most of these are
16 radium as we go down through here.

17 One exception is the natural gas production.
18 There the radionuclides of importance and interest,
19 especially are lead-210 and polonium-210. They're
20 radium-226 daughters, but they're way down the decay
21 chain; and they basically are radon daughters that can
22 build up over time inside of components for gas
23 production.

24 Crude oil and production is what we're
25 talking about, and then there's many other examples.

1 How do we get this radium here? The material
2 in the oilfield is radium brought to the surface in the
3 produced water: Two types, 226 and 228; trace element,
4 soluble form.

5 And as it comes up with the produced water
6 and the oil, the radium chloride -- the water -- comes
7 from a higher temperature and a higher-pressure
8 environment to a lower temperature and a lower pressure
9 environment and it encounters sulfates. And so what's
10 typically formed, then, is a barium sulfate. And the
11 radium being a trace metal goes along with the barium.

12 And so we actually have more like a -- it's a
13 radium-barium sulfate, extremely insoluble, doesn't
14 dissolve in water or -- it just doesn't ... Once it
15 formed that scale in there -- if it was soluble, it
16 wouldn't have formed a scale on the inner surfaces.

17 Produced water carries the radium to ground
18 surface. It's unintentionally concentrated in the
19 scale and the sludge.

20 This is a drawing, a schematic, I stole from
21 a -- I borrowed from another document. This is an EPA
22 publication by I think Vern Rogers & Associates. It
23 demonstrates in a simple fashion -- not to scale, of
24 course -- but the fashion of the water and oil being
25 brought up from the well, from the reservoir, up,

1 pumped out; and you have this water, oil and gas
2 combination. You separate the gas and the oil. In
3 this process the gas goes up here and the water comes
4 out of that too.

5 But down here you have the oil coming down.
6 Then that goes into a heater treater that separates the
7 oil from the water.

8 And in each of these processes, both the
9 line, the flow lines coming up and these steps here,
10 you can get a buildup on the inner surfaces of the pipe
11 and of the containers of scale and sludge. And this
12 buildup of scale and sludge may have elevated levels of
13 radium-226 and -228, depending upon what sort of levels
14 you have down in the formation from which you pumped
15 the oil and water.

16 Some formations have high levels of radium
17 and uranium and thorium. Some formations have
18 relatively low levels. So not all oilfield operations
19 generate oilfield NORM of any consequence. Some do.

20 This site does, and it's obvious from the
21 measurements we made. So the separation gives us areas
22 where you're going to have some concentrations.

23 Over here at the heater treater, oftentimes
24 heater treaters will be cleaned out. And if they
25 opened up the ports here and cleaned it out, oftentimes

1 they will drag out the materials in there and that will
2 be elevated in rating if it's from a formation hazard.

3 So these are the various steps you go back.
4 And we -- nowadays produced water is injected back
5 downhole.

6 Scale occurs in the tubing on the inner
7 surfaces, flow lines and coatings, even the coatings on
8 the sucker rods. Scale is generally composed of barium
9 sulfate and extremely insoluble. Sludge and scale can
10 occur inside heater treaters, separators, and tank
11 bottoms.

12 The other radionuclides aren't present.
13 They -- initially, but they can grow in through
14 radioactive decay. Sludge also appears to include
15 barite, which is barium sulfate, as coatings on the
16 inside there.

17 So oilfield NORM in soil, if you knock out --
18 inadvertently as you're pulling a pipe string or as
19 you're doing your maintenance on a tank battery, as
20 your materials get knocked out of pipe or -- yeah, the
21 inner scale on it, or if you're cleaning out heater
22 treaters or tank bottoms, that's where you're likely to
23 get your oilfield NORM and scale or your sludge.

24 It will remain where it falls. And I can
25 tell you that for hundreds of sites. It doesn't

1 migrate. It will stay within the -- wherever it is on
2 the ground. Some of these sites, you know, are decades
3 old and the material is no deeper than 6 inches to a
4 foot. So it just hangs around there.

5 It's easy -- pretty easy to clean up because
6 it hadn't migrated down.

7 It's highly insoluble, I mentioned. You
8 can't really contaminant -- the only time I found any
9 on myself was when I had cleats, cleated boots, and the
10 stuff was in the cleats, like mud or something in the
11 cleats is when they got -- it's not soluble where it's
12 just going to get on there like a chloride or
13 something.

14 It usually contains -- sludge usually
15 contains much lower concentrations than the scale does.

16 Q. Dr. Frazier, with that background on NORM, I
17 would like to now focus on what you did in Lafourche
18 Parish at the site at issue in this case.

19 Can you explain for the panel a little bit
20 about your role in evaluating potential NORM
21 contamination on the site at issue?

22 A. Yes. Very straightforward. It's a method we
23 use at all oil sites. It's -- we say we're going to do
24 a radiological site characterization.

25 The first thing we look at is what the

1 plaintiffs may assert is on the site. They usually
2 include some information about the previous history of
3 the site, what was done there, what activities were
4 done there. They also include their results of their
5 radiation measurements and their soil sampling.

6 This particular site is a fairly large site,
7 but there are only a few areas, relatively small
8 areas, that the plaintiffs found any impact of NORM,
9 and we went to those areas.

10 A survey was done that we've got here on this
11 figure here, this area 1. That was along the road and
12 they referred to it as a background location. We found
13 it to be background, except it's lower than normal soil
14 of Louisiana because a lot of limestone gravel in
15 roads -- this is a road right through here -- a lot of
16 limestone gravel -- and limestone is low in
17 naturally-occurring radioactive material.

18 So the radiation readings were low. And what
19 we did was perform a radiation survey. You see these,
20 this blue area here? If we expanded that, we would see
21 that that's a series of dots. Each dot had the
22 radiation, gamma radiation reading of a survey meter,
23 very sensitive. Actually, it's the most sensitive
24 gamma survey meter you can use.

25 And that particular device -- I didn't bring

1 one along, but I can explain -- it has a, it's a
2 GPS-based system that gives you the location, easting
3 and northing; and it also records the instrument
4 reading with the instrument right down at the ground.

5 So every second you get a reading, a location
6 and reading. Pretty impressive. And you can basically
7 map out an area for every second you get a reading and
8 helps to determine what the radiation levels are at
9 each location.

10 High radiation levels indicate, more likely
11 than not, higher concentrations in the soil near there.

12 So these are the survey here -- went back --
13 of Area 1 background. Here we got background readings
14 and we collected soil samples there. We tried to get
15 over into the soil, and it was pretty swampy here
16 right off. Off the road, we tried to get over there
17 and it was pretty swampy.

18 We also went to Area 2, which was AOI 8, and
19 Area 3, our Area 3, which is AOI 7; went to Area 4,
20 which is that main tank battery, the operating area
21 there. And these are the areas, 2, 3, and 4, where
22 plaintiffs had found NORM-contaminated soil, and we
23 went there and we found NORM-contaminated soil.

24 This is the number of gamma radiation
25 readings we made at each of these areas, 1, 2, 3, 4,

1 and you can see there are actually thousands of
2 readings. And then the statistics on that, you can see
3 the -- somewhere here. You can see the minimum count
4 array, but then you -- that's usually over gravel,
5 doesn't really mean Louisiana soil. But these maximum
6 readings were well above what you would find for
7 Louisiana soil.

8 And this highest reading is we -- after
9 getting these readings, I determined where we would
10 collect soil samples. I always try to choose the
11 location having the highest reading. And we narrowed
12 that down within a few centimeters before we could
13 actually find it.

14 We collected a soil sample there at two
15 depths: zero to 6 inches and 6 to 12 inches. Our
16 experience is that the material is within the 12 inches
17 usually. If it's more than that, we sample deeper.

18 Q. I think the next slide, Dr. Frazier, will
19 show the locations of the ten samples that you took.
20 And I understand you took samples at each of the
21 locations at either one or two depths.

22 A. Yes.

23 Q. Is that right?

24 A. Well, this first location, this location here
25 we took two samples, two depths.

1 Every location, except right outside of this
2 trailer up here, we took two samples. And outside of
3 that trailer, I hit a refusal. There was a plate or --
4 a metal plate or something there. And I got an
5 elevated reading there on the southwest corner of that
6 trailer; but the -- I took a zero-to-6-inch sample and
7 then couldn't go any deeper. So that's why we only got
8 one sample there.

9 These other locations are over here.

10 Now, not all the samples were collected where
11 we got the highest reading.

12 I wanted to also try to bound the area, so I
13 would go near where we got elevated readings and
14 collect a sample there, two samples there.

15 So these are the lists of locations of those
16 19 samples. And we used the GPS system to, you know,
17 get these values.

18 This background area that we used there,
19 again, the gamma radiation levels in the soil
20 concentrations in this area were lower than normal soil
21 for Louisiana, but we can use that.

22 Q. What is normal soil for Louisiana?

23 A. The natural background concentration for
24 radium-226 in Louisiana soil ranges from about .2 to 3
25 picocuries per gram for 226 and 228. The average is

1 about 1 picocurie per gram -- that's picocurie per
2 gram -- and averaged at about one for each of those.

3 That's a very small amount of activity. It
4 really is.

5 This area AOI 8, plaintiffs had found a
6 couple of -- some readings out there. We surveyed.
7 And what we would do is -- see, all this blue area up
8 here is, these are all beta points, a few thousand of
9 them out here in this area. And you see that the pads
10 cover the area pretty completely.

11 Now, we came over to this area here and got
12 some elevated readings and collected samples there. We
13 had an elevated reading out here in -- at the edge of
14 the woods, back where there's some -- I don't know what
15 it was because it was a small amount.

16 But these areas were pretty small. I think
17 it was like less than 60 square feet. It's pretty
18 small areas. We sampled them and sampled an area in
19 between to see what it looked like. And it was -- the
20 readings were low there, and hence the concentrations
21 were in the range of background. So we didn't have
22 very much area on the AOI 8.

23 But then we went to AOI 7, which we called
24 Area 3. And it's kind of interesting. It's kind of
25 difficult to get out there. You have to climb across a

1 pipe, several pipes here. And if you get off the
2 road -- this is the little road back up through here.
3 We surveyed along the road. You see the blue dots?
4 That means we surveyed along there and got background
5 all the way back.

6 But if you get off the road very far, you're
7 going to get into the muck, wet. In fact, going across
8 this pipe here, we had one guy that was accompanying us
9 that stepped in and got sucked up to his almost knee.
10 But we were able to miss it, thanks to him going first.

11 We walked on down and surveyed back here.
12 And our area back here that we see in these elevated
13 readings matched up pretty closely with what plaintiffs
14 had previously spray-painted on the ground.

15 Irregular-shaped area back here with elevated
16 readings. We collected a soil sample from the highest
17 -- location of highest reading, two samples, two
18 depths; and then one just outside of that to sort of
19 make sure we bounded it somewhat.

20 This material did run over to the edge of the
21 water. Right here, this is, this is water right here
22 in this area.

23 And so, based upon these readings and the
24 experience at sites, I went ahead and chose that this
25 would be two feet deep, even though usually it's no

1 deeper than about a foot, 6 inches to a foot.

2 So I went ahead and assumed that this was
3 two feet deep in this area here. And because the
4 readings, when we got the lab results back -- we'll get
5 those in a minute -- because the readings were above 30
6 picocuries per gram -- and the reason I use that number
7 is because the cost for disposal is significantly
8 different for what they call NORM waste; and that's
9 concentrations with radium greater than 30 picocuries
10 per gram, versus NOW waste, nonhazardous oilfield
11 waste, which is 30 or less. And it's about a factor of
12 12 difference in cost.

13 And so I assumed, based upon my observation
14 of the lab results on this, too, that we're talking
15 NORM waste here. That's the mean concentration when
16 you excavate it for the most part. Some of it would
17 not be, but most of it would be.

18 And so then we went up to the operations
19 area. We verified the operations area with the -- that
20 this was a currently active tank battery site necessary
21 for the current operators to do their work. In fact,
22 subsequent to our survey, I read the deposition
23 transcript of the Hilcorp representative and pointed
24 this out being the area of active operations, and it
25 clearly was. We were up there.

1 We surveyed this area. All where you see the
2 blue, all that was surveyed. A few thousand points,
3 and collected samples. You can see the samples. This
4 is where I mentioned, that little spot right here at
5 the southwest corner of that trailer where we got a
6 high reading. We found spots that plaintiffs had not
7 found in this area.

8 This year up through here, you'll see these
9 are nice blue. Well, it's got gravel over it. So one
10 would say, in the ultimate disposition of this site,
11 they would need to remove that gravel and survey under
12 it. But this site is not part of the limited
13 admission. It's AOI 7 and 8 that are. But there's
14 clearly some oilfield NORM at this site, different
15 areas.

16 Actually found some along this pipeline here.
17 I thought the pipeline was the source of the readings.
18 And then, you know, when you're surveying, if you
19 survey next to a pipe and you would expect it would --
20 if it's from the contents of the pipe, it would drop
21 off as you go away from the pipe. Well, as I went away
22 from the pipe down toward the ground, it increased.
23 And as we collected samples at the ground and said, ah,
24 it's actually in the ground here. Part of the reading
25 was from the pipe but part from the ground.

1 Q. Dr. Frazier, why are you not recommending
2 that there be a remediation of the NORM at this current
3 operating site?

4 A. Well, it's because it's -- this is, this site
5 is, has a NORM general license. They are operating
6 under a NORM general license that was transferred from
7 Hess to Hilcorp a few years ago. I want to say 2006 or
8 something like that, and so they operate under a NORM
9 general license.

10 And there are requirements under the state
11 LDEQ regulations for those operations. And it is
12 acceptable to have these levels of NORM at a general
13 licensed site. They have to have a program in place
14 for their workers, and access restriction to the site
15 and things like that. So this is pretty normal for an
16 operating site that is currently operating. They can't
17 clean it up because it's ongoing operations.

18 And it's pointed out here with this -- this
19 is from the Hilcorp representative indicating where the
20 active operations are right now, in this area here.

21 Q. And she identified, like you said, that
22 central tank battery is kind of the hub of Hilcorp's
23 ongoing current operations; correct?

24 A. Yes, yes. And, in fact, when you're out
25 there, you can see, it's a pretty busy place.

1 And this is a NORM general license transfer.
2 I guess this was in -- it is 2006.

3 MS. WHEELER: Yeah. For the panel's
4 reference, the NORM general license documents
5 are included as Exhibit 5 in the
6 non-objected-to exhibits. I think it's
7 Tab 20, 21, of your binders.

8 And then the full Hilcorp deposition is
9 Exhibit 3, with the maps that we just looked
10 at one of them, are attached as Exhibit 4.

11 THE WITNESS: And it's not the same general
12 license number. The one that Hess had, but
13 it had a general license number. And when
14 they transferred it to the Hilcorp, they
15 assigned a different general license number;
16 but it's the same site, and it has a general
17 license.

18 These are the results of the soil
19 sampling, the rating sampling.

20 I'm sorry you can't see that. If you
21 have a copy of it, you can see it there. I
22 think everybody does up there.

23 You can see, there are some pretty good
24 concentrations in here. Here's a 247.

25 And I could go through and, you know,

1 point out where these are; but certainly some
2 of these were from that AOI 7, some of the
3 higher concentrations were there.

4 And the active tank battery had some
5 high concentrations too. That's the reason
6 that -- and you can also see the -- you'll
7 see the samples here. If you look, there
8 will be two samples at each location, except
9 for that one that didn't. And you can see a
10 shallower -- I mean, the deeper sample, from
11 6 to 12 inches, is a much lower
12 concentration. And that's pretty typical.

13 One thing that I didn't mention is that,
14 after we collected samples -- we collect the
15 soil samples with a T-bar hand auger and --
16 zero-to-6-inch, and we knocked it out. And
17 then we decontaminant the sampler, and then
18 we go down do the 6-to-12-inch and
19 decontaminate the sampler on that, just to
20 get the bulk of materials off of it and wash
21 it down.

22 And then after we get that borehole, we
23 take the -- one of these gamma detectors and
24 we lower it down into the borehole and
25 actually log the hole, and we see how the

1 count rate decreases as we go down.

2 Well, it does -- because of geometry, it
3 increases initially, because you're
4 surrounding it with dirt. But on these -- as
5 you go down, it will show that it drops off
6 from these that are contaminated, and it goes
7 down. It helps you to estimate the depth of
8 it.

9 But the concentrations there clearly
10 would need to be removed if you're going to
11 release the site from restricted use.

12 BY MS. WHEELER:

13 Q. So, Dr. Frazier, based upon your analysis and
14 evaluation of the site, of your gamma rays surveys,
15 your sampling, and your survey of the boreholes using a
16 measuring device, you have determined that there are
17 two AOIs that are in the GHD Hess plan 7 and 8 where
18 there needs to be some soil removal; correct --

19 A. Yes.

20 Q. -- for NORM contamination.

21 A. AOI 7 and AOI 8.

22 Q. Let's look first at the next slide, which is
23 the polygon of where you've identified there needs to
24 be some soil removal at AOI 7. And how did you develop
25 that?

1 A. Well, this is developed based upon the
2 surface gamma rays readings, all those detailed
3 measurements of the gamma radiation levels at the
4 surface with the GPS system. The data are all in a
5 database and the graphical presentation too.

6 The guy that did the surveys, he's out of
7 Albuquerque -- he's the best -- and prepared this
8 polygon marking off all the areas where there was any
9 elevated readings above the range that we would expect
10 for background.

11 And since we collected a sample at the
12 highest location here, and then at a location near
13 there but where he got a normal reading to verify that
14 we were okay, this gave us our area that was marked off
15 with a, I want to say an RGIS system or something like
16 that, and marked off this area. And I think this was
17 around 1200 square feet or something like that.

18 Q. Yes, 1274 square feet is what it reads.

19 A. Yeah, I think you're talking about 300ths of
20 an acre or something, you know, 2 or 300ths of an acre.
21 A small area really, but at a depth to two feet,
22 assuming there; and that would give us the total volume
23 for it.

24 Now on the AOI 8, the areas were much smaller
25 and -- areas were much smaller for that. And again he

1 laid out the bounds with these colored circles here, or
2 polygons or whatever.

3 Q. Right. And the one on the left I believe
4 reads 273 square feet, you'll remove from the
5 zero-to-two-foot level?

6 A. Right. That's I think 57 square feet, wasn't
7 it?

8 Q. Yes, yes. 57 square feet on the right.

9 A. I can't see that. I don't know what that one
10 is, but anyway.

11 Q. 273.

12 A. 273. So total area for these two is pretty
13 small.

14 Q. Very small.

15 A. In fact, when you go out there, you have to
16 be very near these spots to find them. In fact with
17 any of these things, you get much more than a couple of
18 meters away, you don't know they are there. Hence you
19 don't get a radiation dose, external dose from them
20 unless you're right on top of them. Okay.

21 Q. Dr. Frazier, what's going to be the target
22 for soil removal at these two sites?

23 A. Well, the LDEQ, in their regulations for NORM
24 release for unrestricted use, gives a remedial
25 standard, remediation standard that decontamination of

1 soil of 5 picocuries for gram above background for
2 radium-226 or radium-228. That's a pretty low
3 standard, but that's what they have chosen.

4 In fact, though, the cleanup guys, they are
5 out there surveying as they are digging, and they don't
6 want to leave anything above background, above the
7 range of background. So they will survey and survey
8 and survey with their gamma detectors. And they also
9 collect samples after they have finished to demonstrate
10 that they have removed it all.

11 So it's my experience that, when these guys
12 go out there, they are not going to leave anything
13 above the range of background; not just 5 above
14 background, but above the range of background.

15 I don't want to be cynical about it, but I
16 think that's the truth: They get paid by the cubic
17 yard. And they are going to say, We don't want to
18 leave anything out here. Well, that's true. So
19 they'll remove it.

20 Q. The next slide, Dr. Frazier, is -- or the
21 next two slides I think were going to be the cost
22 estimates for the remediation that's being proposed at
23 each of the AOIs.

24 So let's look at AOI 7. And if you could
25 just kind of walk us through.

1 I know you have had a contractor, or GHD
2 assisted you in having a contractor price out what it
3 would cost to remove the soil and dispose of it at this
4 site. Tell us, tell us how this is done generally.

5 A. Well, this is pretty standard. I did not
6 prepare this, but it's a pretty standard type of a cost
7 estimate.

8 You've got your personnel here. Your project
9 manager is usually your radiation safety officer. Make
10 sure they have a health and safety plan in place and
11 got all the documents filled out, all the forms filled
12 out for the state's approval to remove material. They
13 have an equipment operator to, you know, dig the stuff
14 up. Then they have got a couple of surveyors: One to
15 monitor the radiation levels of the stuff they are
16 removing and the background levels too.

17 They have got the equipment costs, pretty
18 standard type thing here. But you can look on down,
19 you can see the -- get down here.

20 I can't hardly see that.

21 Q. Disposal for NOW is \$20 per barrel I think.

22 A. Right. You see that NORM cost there?

23 Q. 245.

24 A. That's \$245 a barrel. That's because it's
25 more than 30 picocuries per gram. If it's 30 or less,

1 than it's NOW waste disposal, and that -- both of these
2 would be going to permitted disposal facilities.

3 And there's just that difference in the cost
4 there.

5 And you can see where the bulk of this
6 disposal thing is going to be from the NORM waste here
7 as you go down through there.

8 This total cost is -- it's a little difficult
9 to get to the site, to this particular site. Remember,
10 you have to get across the pipe and get back down the
11 little road there. So it depends on how they, what
12 extra time it takes them to get out to it and get to it
13 and haul the stuff out.

14 The other site, lots smaller volume, smaller
15 area too. And you can see from that that you have --
16 trying to see the numbers there. I don't see it. But
17 it's a smaller amount for AOI 8. You don't have as
18 much NORM there.

19 Q. Okay. Have you evaluated the risk to human
20 health and the environment as regarding the NORM that
21 will be potentially left at the tank battery that we're
22 not targeting for removal here because you've got an
23 active operator operating under a NORM general license
24 so we don't need to remove that NORM?

25 A. Yes. The primary consideration here, of

1 course, is it's a NORM general license, and the current
2 operator has requirements in place that they are
3 meeting for operating the site as it is. It's fairly
4 common to have NORM-impacted materials on the site when
5 operating under a NORM general license.

6 There are areas on the site that, at the tank
7 battery area there, that would have a potential for
8 above-background dose to the workforce because of their
9 exposure duration -- even though the areas are
10 relatively small -- still would be the potential there.
11 Probably a measurable above natural background
12 radiation dose is there.

13 But for inadvertent individuals coming to the
14 site or travelers, whatever -- of course, site access
15 is controlled by the operator. But inadvertent
16 exposure duration for those people would be so low as
17 not to give any dose above the range of background.

18 Q. Dr. Frazier, since you were talking about
19 this area for -- that is currently being operated by
20 Hilcorp, wouldn't Hilcorp address the NORM
21 contamination at the end of the life of the lease and
22 kind of go through the same process we're doing for AOI
23 7 and 8 and do a removal at that point?

24 MR. HUDDALL: Objection. Calls for
25 speculation.

1 BY MS. WHEELER:

2 Q. Would you expect them to?

3 MR. HUDDALL: Objection.

4 THE HEARING OFFICER: Objection overruled.

5 THE WITNESS: The requirements of the general
6 license says, When you wrap up operations,
7 you've got to follow the requirements for
8 cleanup, for release to unrestricted use.

9 And so Hilcorp may be holder of the
10 general license. When they are shutting down
11 their operations in the future, they would be
12 cleaning up to the level for unrestricted
13 use.

14 BY MS. WHEELER:

15 Q. Thank you.

16 Dr. Frazier, what about the potential
17 radiation dose to a casual visitor to the site, like a
18 deer hunter or a neighbor of the property?

19 A. No, you have to be right on top of the
20 sources there to get any dose at all. And the exposure
21 duration would be so short, relatively, to the total
22 time a worker might be there; it would be a no-dose
23 scenario that would be, give a dose outside the range
24 or greater than the range of natural background doses.

25 Q. Dr. Frazier, what about the potential risk or

1 impact -- I'm sorry -- to bugs and bunnies that might
2 be at the site?

3 I know you haven't done a full blown risk
4 assessment, but tell us why you didn't and what that
5 potential risk is, if any.

6 A. Yeah, a couple of factors. One is that, if
7 there is no -- if people are protected, if there's no
8 adverse radiation dose to people, then there would be
9 even less dose consequence to animals and plants from
10 this NORM.

11 The important thing about this material, that
12 is especially for animals, is that it's not soluble.
13 So if it were to be ingested, it passes right through
14 the gut and it doesn't get into the bloodstream and
15 give them a dose to the bone or to the other tissues.
16 So the chemical-physical form is such that it's not
17 going to be taken up to give a radiation dose to other
18 animals and things.

19 Similarly for people who work out there. If
20 they should incidentally ingest it, it's going to pass
21 on through without getting material taken up into the
22 bloodstream. So if people are protected, then, with
23 not having an adverse dose, then so too would be
24 animals, even more so.

25 Q. Now, you've reviewed the report of

1 plaintiffs' expert, ecological evaluation -- eco-tox
2 expert, Dr. Jim Rogers with Omega. Correct?

3 A. Yes.

4 Q. Okay. And he expresses a different opinion.
5 He basically says that plants and animals may be
6 potentially impacted by the NORM levels at the site.

7 You disagree with that opinion?

8 A. Yes. There's a couple of main problems with
9 it is, one is his model. He assumed this very large
10 area -- many, many times the area that's impacted -- he
11 assumed this large area was impacted at these highest
12 concentrations. And that is necessary to have the
13 range of these two animals he says are potentially
14 adversely affected.

15 But since you have such a small area of
16 impacted soil there, that defies logic and it defies
17 the site data.

18 The other thing, he assumes that the radium
19 that's in this material is a soluble form that would be
20 taken up in the body; but it's not, it's an insoluble
21 form. And therefore both of those factors cause his
22 conclusion to be false.

23 Q. So based upon your extensive education, your
24 training and your experience in NORM radiation issues,
25 it's your opinion that the levels of NORM that may be

1 left at the site that were found at the central tank
2 battery, that those won't pose a risk to humans or the
3 environment if they are left there to be removed at the
4 conclusion of the lease by the current operator under
5 their general license. Is that right?

6 A. Yes. That's a long question, but yes.

7 Q. Okay.

8 MS. WHEELER: Thank you. I tender the
9 witness.

10 THE HEARING OFFICER: Mr. Huddell, cross
11 examination?

12 CROSS EXAMINATION

13 BY MR. HUDDELL:

14 Q. Good morning, Dr. Frazier.

15 A. Good morning.

16 Q. You stated that NORM is generally not
17 soluble; correct?

18 A. Oilfield NORM.

19 Q. Oilfield NORM is generally not soluble?

20 A. That's correct.

21 Q. Now, you're aware that there is data that
22 shows that both parties have found high levels of
23 leachate chlorides out at the property; right?

24 Or have you seen that data?

25 A. I've seen some data for groundwater.

1 Q. Okay.

2 A. But I didn't -- that's not part of my -- I
3 think we're talking about soil. So I haven't seen data
4 that we have for --

5 Q. Well, you would generally agree that the
6 presence of chlorides increases the mobility of radium;
7 right?

8 A. In water. In water, yes. Absolutely.
9 That's the theory by which you have the increased
10 levels in the produced water coming up.

11 MS. WHEELER: I would like to just pose an
12 objection to questions about groundwater,
13 since that's not part of our limited
14 admissions, as being outside the scope.

15 THE HEARING OFFICER: Yeah, I'm going to
16 overrule the objection.

17 I mean, you testified about barium
18 sulfate and solubility. You testified, I
19 think, that in other forms it's soluble.

20 Groundwater is not in this case, but I'm
21 going to let this question and this go for
22 awhile because I think it's appropriate. I
23 think it's a fair question.

24 I'm going to overrule the objection.

25 BY MR. HUDDALL:

1 Q. Dr. Frazier, you would expect that the
2 presence of chlorides would actually help release the
3 natural radium that's already present in the soils into
4 the aquifer; correct?

5 A. The natural radium that's in soil.

6 All soil has radium in it, 226, 228, about
7 the same levels. And the presence of chlorides will
8 cause that stuff to increase, that natural radium to
9 come out into water as a radium chloride.

10 It will not cause the radium to come out of
11 the barium sulfate though, that scale.

12 Q. And you would agree that the higher the
13 chlorides, the higher the level of radium; correct?

14 A. Generally, that's true.

15 Q. And I believe you also stated that it
16 increases the mobility; correct?

17 A. Yes, sir, that's true. That's certainly the
18 theory and that's observation, especially at higher
19 levels of chlorides.

20 MR. HUDDALL: Connie, could you pull up slide
21 20.

22 Q. All right. Dr. Frazier, this shows the four
23 areas that you examined; correct?

24 A. Yes.

25 Q. And these areas were selected because those

1 were areas that the landowners' expert had found;
2 correct?

3 A. Yes. The landowners' expert actually looked
4 at other areas but did not find any NORM-impacted soil
5 in those other areas.

6 Q. Okay. And if we can look at area 4, which
7 would be slide 22?

8 Okay. So at slide 22, Area 4, we've got,
9 we've got sample locations STRS 7, 8, 9 and 10; is that
10 right? And actually you have a screen right next to
11 you if you want to look there.

12 A. Thank you. That's much better.

13 7, 8, 9 and 10, that's correct.

14 Q. And those are -- that area is an area that
15 you don't plan to do any remediation; right?

16 A. That's correct.

17 Q. And that's based on reading Hilcorp
18 representative's deposition, is that right, that they
19 are currently operating that property, that area?

20 A. Yes, and the fact that it's operating under a
21 NORM general license.

22 Q. Okay. Are you aware that the excerpt of that
23 deposition that Hess did not include also -- the
24 representative there also stated that she has no idea
25 whether cleanup there would be a problem or not?

1 Were you given that excerpt?

2 A. I never heard that. But I don't know what
3 you mean by "problem." We can remove the soil.

4 Q. Let me ask you this: What levels did we find
5 at site STRS 7? And this will be slide 26.

6 A. That was the one down next to the trailer. I
7 only got one sample there.

8 Q. Okay.

9 A. You moved on me there.

10 Go back.

11 MR. HUDDALL: Is it slide 26?

12 THE WITNESS: There you go.

13 BY MR. HUDDALL:

14 Q. You're right. Slide 30. Slide 30.

15 A. Yeah, I don't remember the exact number, but
16 I collected that sample down until I hit a piece of
17 metal.

18 Q. Okay. Well, we have your data table at slide
19 30.

20 A. Okay. So 7, that was 67.8 picocuries per
21 gram.

22 Q. Okay. So that's --

23 A. Radium-226.

24 And the radium-228 was one, which is
25 background basically.

1 Q. All right. Well, just looking at radium-226
2 for the moment, that's about 13 times the DEQ
3 acceptable level; correct?

4 A. No, it's about 67 times background.

5 Q. Okay. About 67 times background.

6 How about, how about number 8, site 8? What
7 value do we have for 226?

8 A. That's 345 picocuries per gram, with
9 basically background radium-228, so ...

10 So now that one -- I'm trying to remember
11 where 8 was, if you went back to that slide.

12 Was it up under the pipe?

13 MR. HUDDALL: Slide 22?

14 THE WITNESS: Yeah.

15 Yeah, 8 is right under the pipe, where I
16 said I measured and I got a higher reading to
17 ground under the pipe, and that was along the
18 little low area under that pipe, yes.

19 BY MR. HUDDALL:

20 Q. And that's about 70 times the 5 picocurie
21 limit?

22 A. Well, it's about 300-and-some times the
23 background.

24 Q. Okay. And well above the DEQ limit; right?

25 A. Well, sure, for release for unrestricted use,

1 you know. That has a specific definition.

2 Q. Okay. Let's move on to site 10. What value
3 for 226 did we get at site 10?

4 A. Well, that's where I got the highest reading,
5 and that was in a, I want to say a mucky-type area,
6 oily-looking, greasy-looking thing there. I don't know
7 what it was. I don't know what it was there formerly.

8 But that's also where I think plaintiffs'
9 experts found their highest concentration too. I
10 think.

11 And that was about 420 picocuries per gram
12 for 226, but about 22 picocuries per gram for
13 radium-228. So that wasn't quite as old as the sample
14 8 and 9 there.

15 Q. Okay. You would agree that 421 picocuries
16 per gram is well over the DEQ limit of 5; right?

17 A. Oh, sure. Absolutely.

18 Q. And in fact you would recommend that that
19 actually get cleaned up by the current operator;
20 correct?

21 A. Upon the release for unrestricted use,
22 absolutely. That's required by the termination of the
23 general license.

24 Q. And you don't know for a fact that cleanup is
25 impossible because of current operations; right?

1 A. Well, it's my opinion that they are
2 continuing to generate NORM during the current
3 operations.

4 So if you clean it up now, you're going to
5 generate more. So operating under a general license,
6 that's the way it's specified; and you can continue,
7 until such time as you choose to cease operations and
8 terminate the license.

9 Q. And who told you that Hess has not admitted
10 responsibility for that area?

11 A. I'm sorry?

12 Q. Who is it that told you that Hess has not
13 admitted responsibility for that area, Area 4 where we
14 had the highest levels of NORM?

15 A. No one has told me that.

16 Q. Okay. You stated that earlier, that Hess --

17 A. Well, at the transfer of the general license.
18 But no one has told me that they have not
19 admitted responsibility or admitted responsibility for
20 it. I don't know. Neither way.

21 Q. And just to be clear, you weren't asked to
22 look at the ecological risk of harm for radiation at
23 the Raceland property, were you?

24 A. I was not asked to do a formal ecological
25 risk assessment, no.

1 MR. ARNOLD: All right. That's all I have.

2 THE HEARING OFFICER: Ms. Wheeler?

3 REDIRECT EXAMINATION

4 BY MS. WHEELER:

5 Q. Yes, sir.

6 Dr. Frazier, I just want to make clear that
7 you're not saying that the central tank battery that's
8 Area 4 of your investigation should not be cleaned up.
9 You're saying that the process to clean it up would be
10 done by Hilcorp at the termination of their lease.
11 Correct?

12 A. Oh, absolutely. You know, it's -- the amount
13 of NORM out there would clearly exceed the exemption
14 level and the cleanup regs.

15 Q. And under the current regs, with a NORM
16 general license, they can continue to operate as is
17 with the NORM levels that you saw there. Correct?

18 A. That's correct.

19 MS. WHEELER: Thank you.

20 THE HEARING OFFICER: You-all want to leave
21 for questions?

22 MR. PENNINGTON: I don't have any questions.

23 THE HEARING OFFICER: Okay. No questions?

24 Okay, Dr. Frazier, you're excused.
25 Thank you.

1 I think we're going to the other side
2 for a witness.

3 MR. CASH: Correct. We're not resting, but
4 we're going to go out of order, so turn it
5 over to you.

6 THE HEARING OFFICER: I understand.

7 MR. ARNOLD: We would like to call Dr. George
8 Castille.

9 THE HEARING OFFICER: For the record,
10 counsel, I haven't met you.

11 Can you identify yourself for the
12 record?

13 MR. ARNOLD: I'm John Arnold on behalf of the
14 Plaintiffs, yes, sir.

15 THE HEARING OFFICER: Okay, Mr. Arnold.

16 WHEREUPON, GEORGE JOSEPH CASTILLE III,
17 having been duly sworn, testified as
18 follows:

19 DIRECT EXAMINATION

20 BY MR. ARNOLD:

21 Q. Dr. Castille, can you please state your name.

22 A. My name is George Joseph Castille, III.

23 Q. And what is your current occupation?

24 A. I am a geographer. I am self-employed.

25 Q. And where is your employment?

1 A. Here in Baton Rouge.

2 Q. What's the name of the firm that you work
3 for?

4 A. Castille Consulting Services, LLC.

5 Q. And what's your position there, sir?

6 A. I'm the head of the firm.

7 Q. Could you briefly just describe the subject
8 matter of your specialties?

9 A. I started out as an archeologist. I worked
10 as an archeologist for about 15 years. And then I
11 shifted gears and went back to school and got a degree
12 in geography.

13 And my specialty, general areas of expertise
14 are in historical, cultural geography. Those are the
15 primary fields.

16 Q. You mentioned your formal education. Where
17 did you get your formal education?

18 A. I got my bachelor's degree at LSU in
19 anthropology in 1973, my master's in anthropology in
20 1979, and Ph.D. in geography at LSU in 1993.

21 Q. Let's talk a little bit about what you did
22 after you graduated from LSU.

23 A. After my bachelor's degree, I worked as an
24 archeologist for a few years. And I went back to
25 school and got my master's in '79; and then continued

1 working as an archeologist for a number of years, first
2 at the state archeologist office, then later as a
3 consultant with the firm Coastal Environments
4 Incorporated. I worked there for about ten years.

5 And then I went back to grad school in the
6 late 80s and got my degree in geography. So I kind of
7 switched fields at that time.

8 Q. And that takes us up through your master's;
9 is that correct?

10 A. Through my master's and my Ph.D.

11 After I obtained my Ph.D., I worked as an
12 independent consultant for a short period of time. And
13 then I went back to Coastal Environments and was
14 employed by them again beginning, I think, 1995.

15 I headed the litigation section of the
16 company. I was the person in charge of overseeing any
17 projects that involved litigation or disputes. And I
18 did that from '95 on, until about 2007 or so.

19 Then I left CEI and went to work for an
20 engineering firm in town called GEC. I worked there
21 for about a year and a half. I established the
22 litigation section there while I worked there. And
23 then I went off on my own and have been an independent
24 consultant ever since.

25 Q. Let's talk a little bit about your training

1 and experience in those positions.

2 You're a geographer; is that right?

3 A. Yes.

4 Q. What is "geography"?

5 A. It's simply the study of the earth's surface.

6 And my area of interest is in cultural
7 historical geography, and that is basically the study
8 of man's impact on the earth's surface. And that's a
9 very broad topic, but that was the nature of my
10 interest.

11 Q. And as part of your work, you consistently
12 rely on aerial photographs; is that right?

13 A. Yes.

14 Q. You have been doing that for how long as part
15 of your work?

16 A. Well, ever since I started working as an
17 archeologist back in the late 70s. I mean, I've used
18 aerial photography forever in my career, just as I've
19 used historic maps. I mean, that's always been an
20 important part of the type of research that I do.

21 Q. And why is that? What is the purpose for
22 those maps and photos?

23 A. Well, both in archeology -- and my specialty
24 there was historical archeology -- and in geography,
25 it's important to understand changes that have occurred

1 over time. And historic maps and aerial photographs
2 both allow one to see what changes in the landscape
3 have occurred over time.

4 Q. So that's something you have been doing since
5 you were in college probably; is that right?

6 A. Yes.

7 Q. And also as part of your work as a
8 geographer, it's given you the opportunity to work on
9 projects that examine cypress trees; is that right?

10 A. Yes.

11 Q. Can you tell us a little bit about that?

12 A. Well, I started doing research on the, on
13 cypress trees probably during the 1980s or so.

14 I worked on a number of disputes, and some of
15 them were lawsuits involving water bottoms ownership
16 issues. In fact my dissertation topic was on water
17 bottom ownership, state water bottom ownership in south
18 Louisiana.

19 And so cypress trees are very important when
20 you're trying to determine ancient shorelines, for
21 instance. And so I became interested in research on
22 cypress as a result of the work that I was doing on
23 property ownership disputes; specifically, trying to
24 determine whether or not a water bottom was owned by
25 the state or owned by an adjacent landowner.

1 So because cypress grow along shore,
2 shorelines and grow along bank lines, they are very
3 significant clues as to sedimentation, as to hydrology,
4 water level ranges, a number of different things.
5 Cypress are very good indicators of changes that have
6 occurred, particularly with respect to shorelines and
7 bank lines; and so that's how I got interested in them.

8 Q. And you mentioned your litigation experience.
9 What type of cases have you been involved in?

10 A. How many cases?

11 Q. No. What type of cases?

12 A. Primarily two types of cases.

13 Most of my early work was related to property
14 ownership, more specifically, water bottoms ownership
15 issues. In the early part of my career, I would say
16 90 percent of the work was related to that, water
17 bottoms ownership.

18 And over time I began to get involved in some
19 of the legacy cases, litigation involving oil and gas
20 impacts on the environment.

21 And so at this point it's maybe 50/50, 60/40,
22 something like that, as far as those two areas of
23 investigation.

24 Q. In those legacy cases, you've had an
25 opportunity to look at the, look at issues related to

1 oilfield wastes and their impacts on the morphological
2 characteristics of cypress; is that right?

3 A. Yes.

4 THE COURT REPORTER: Could you state that
5 question again?

6 BY MR. ARNOLD:

7 Q. I'll try.

8 In your experience in litigation as it
9 relates to legacy site work that you've done, you've
10 been able to look at issues related to oilfield waste
11 contamination and its impacts on morphological
12 conditions of cypress; is that correct?

13 A. Yes.

14 Q. And you've worked -- tell me who you have
15 worked for. In your water-bottom dispute work and your
16 legacy work, who have been your clients in the
17 litigation that you've done?

18 A. Well, in the water bottoms cases, some of the
19 work I did was for state agencies, the attorney
20 general's office, state land office, more recently the
21 Department of Wildlife and Fisheries. I've worked for
22 private landowners, done work for federal agencies,
23 primarily Corps of Engineers. Those are -- that's the
24 lion's share of the water-bottoms cases.

25 Now, for the legacy cases, I've worked

1 primarily for plaintiffs, for landowners. I have done
2 some water bottoms work for oil and gas interests as
3 well. So a variety.

4 Q. And your litigation experience began -- you
5 described a little bit about how you started. When was
6 that? Back in the early 90s or late 90s; is that
7 correct, your litigation experience?

8 A. When I started litigation?

9 Q. (No response, counsel nods.)

10 A. Oh, no. First litigation project I worked on
11 was 1980, and that was for the attorney general's
12 office, False River investigation.

13 And immediately after that, the Raccourci Old
14 River case I worked on for the Attorney General's,
15 Attorney General's office.

16 And then after that I began doing work for --
17 through Coastal Environments, doing work for private
18 landowners.

19 THE COURT REPORTER: What river was that?

20 THE WITNESS: Raccourci Old River. It's a
21 lake, depending how you look at it, lake or a
22 stream. That was one of the issues.

23 BY MR. ARNOLD:

24 Q. Okay. So you have been doing this for almost
25 30 years; is that right, this type of work, these type

1 of investigations?

2 A. Yes. About.

3 Q. And what is it about your education and
4 training experience that allows you to look into the
5 cypress trees and their morphological characteristics
6 and their responses to different hydrologic settings?

7 A. Well, as I pointed out a few minutes ago,
8 cypress are pretty important, particularly, for water
9 bottoms research, because they are indicators of
10 ancient land forms. And that's one of the things I was
11 interested in is trying to -- for instance -- and lake
12 research, trying to determine where an ancient
13 lakeshore was.

14 And I worked on a number of cases involving
15 disputes over: What is the ordinary high water? what
16 is the ordinary low water? that sort of thing. And
17 because cypress are water-tolerant or a water-tolerant
18 species, they indicate a lot, provide a lot of
19 information on what the ordinary low water is and what
20 the ordinary high water is when you're looking at
21 ancient shorelines. And that's how I got interested in
22 it.

23 I started looking at maps and aerial
24 photographs; going out, examining trees, working with
25 dendrochronologists, people who were coring trees,

1 aging trees; began excavating the base of trees,
2 looking at their roots, that sort of thing. I did that
3 on a number of different projects.

4 Q. This is a pretty specialized profession.
5 Right? There's not a lot of people that do this type
6 of work; is that right?

7 A. I would say that's, yes, yeah. I don't know
8 anyone else who really does that sort of thing. Not in
9 Louisiana anyway.

10 MR. ARNOLD: I would like to offer, file and
11 introduce Dr. Castille's CV into evidence,
12 and tender him as an expert in the fields of
13 historical geography, aerial photo
14 interpretation, characteristics of cypress
15 trees and analysis of historic maps.

16 THE HEARING OFFICER: Okay. I'm not sure I
17 have all that down.

18 But historical geography, aerial photo
19 interpretation, characteristics of cypress
20 trees, and analysis of historic maps?

21 MR. ARNOLD: Yes, sir.

22 THE HEARING OFFICER: Okay.

23 Who is it? Is it Mr. Lapeze? Do you
24 want to voir dire?

25 MR. LAPEZE: Yes. I am going to have some

1 voir dire.

2 First I would like to say, I'm not aware
3 of a scientifically recognized field
4 regarding characteristics of cypress trees.

5 That is an incredibly brood tender, and
6 if we could get some specificity with respect
7 to characteristics of cypress trees?

8 THE HEARING OFFICER: You can voir dire him.

9 Let me just ask you this: I mean, your
10 background is in -- you talked about
11 geography. You talked about -- what was your
12 original degrees? I'm sorry.

13 THE WITNESS: Anthropology, archeology.

14 THE HEARING OFFICER: Anthropology?

15 You don't have any degrees related to
16 botany or vegetation or plant growth or
17 anything like that?

18 THE WITNESS: No.

19 THE HEARING OFFICER: Have you been accepted
20 in any proceeding, in court or any
21 administrative proceeding, as an expert in
22 characteristics of cypress trees?

23 THE WITNESS: I have been accepted as an
24 excerpt in cypress swamps in state court in
25 St. Charles Parish.

1 THE HEARING OFFICER: Whose courtroom were
2 you in in St. Charles Parish? Do you recall
3 the judge?

4 THE WITNESS: I don't recall the judge.

5 THE HEARING OFFICER: I'm going to let him
6 voir dire you.

7 I don't have a problem with historical
8 geography and aerial photo interpretation and
9 analysis of historical maps.

10 You know, it appears to me, based on
11 what I've heard you tell us here today, that
12 characteristics of cypress trees has been all
13 litigation related. And I'm not diminishing
14 litigation support; but, with respect to
15 education and training, it sounds to me, just
16 listening, that that is not a specialized
17 field. I mean, you obviously helped out with
18 respect to geography, aerial photography, and
19 I know we've seen some of that here.

20 Again, I don't have any problem
21 accepting you in historical geography, aerial
22 photo interpretation and analysis of
23 historical maps.

24 And I realize there has been some
25 testimony about whether those historical maps

1 have cypress trees.

2 I'm concerned about creating some sort
3 of expertise here that may not have a basis
4 in education and experience outside of what
5 we're talking about litigation.

6 But, Mr. Lapeze, why don't you go ahead
7 and voir dire him and let me hear a little
8 more.

9 MR. LAPEZE: Well, with respect to the
10 tenders of historical photography, aerial
11 photo interpretation and analysis of
12 historical -- I missed the last word.

13 THE HEARING OFFICER: Historical geography,
14 aerial photo interpretation, and analysis of
15 historical maps, those are the areas. He's
16 got background in geography and anthropology.

17 MR. LAPEZE: We agree with the
18 characterization, Mr. Balhoff, to the extent
19 he's a geographer. We have no objection to
20 the tender of those three areas, subject to
21 our general and running objection with
22 respect to the use of aerial photos for any
23 historical purpose in the case.

24 But certainly with respect to cypress
25 trees, I have some questions for

1 Mr. Castille.

2 THE HEARING OFFICER: Okay. This is what I'm
3 going to do.

4 You've got your testimony that you're
5 going to provide, and I'm going to allow the
6 questions.

7 I'm not going to accept -- You can
8 testify factually and you can testify as an
9 expert on historical geography, aerial photo
10 interpretation and analysis of historical
11 maps.

12 I'm not going to cut the testimony off
13 with respect to cypress trees. We heard some
14 of that. But I'm not going to accept you as
15 an expert in that category. Okay?

16 MR. ARNOLD: Fair enough.

17 THE HEARING OFFICER: But I'm not going to
18 limit your questioning. But he's not an
19 expert in the category. He's not being
20 accepted as an expert. Fair?

21 MR. ARNOLD: Yes, sir.

22 THE HEARING OFFICER: Okay.

23 Mr. Castille, just so I'm clear: I'm
24 not minimizing your background and
25 experience. I've just -- that's -- you know,

1 it just seems to me that there ought to be
2 something more in the way of education and
3 training that relates to plant life.

4 Okay. Go ahead, Mr. Arnold.

5 MR. ARNOLD: Thank you.

6 MR. LAPEZE: I'm sorry, John. Hold on one
7 second.

8 Just so we're clear and so the record is
9 clear, his testimony is not going to be
10 considered expert testimony for the purposes
11 of anything relating to cypress trees?

12 THE HEARING OFFICER: Correct.

13 MR. LAPEZE: Thank you.

14 BY MR. ARNOLD:

15 Q. Dr. Castille, you performed an analysis of
16 the historical aerials and the maps of this site;
17 correct?

18 A. Yes.

19 Q. How did those inform your opinions regarding
20 the environmental conditions on the property?

21 A. Well, the aerial photographs were very
22 important in that they indicated changes in the
23 landscape that occurred over time.

24 Q. Well, let's look, let's go through just a
25 couple of them or a few of them, starting with 1941.

1 What does this aerial tell you about the
2 subject property?

3 A. Well, in 1941 the oil and gas development had
4 just begun. It was just a few years old.

5 You can see the various canals that were
6 associated with the early oil and gas development.

7 Access during the early period was by canal.
8 Later on it was by road.

9 Do I have a button on this thing?

10 You can see the oil and gas-related canals.
11 And initially most of the canals followed previously
12 excavated logging canals during the industrial cypress
13 logging era which had occurred a few years before. In
14 fact, you can see scarring. You can see this
15 fan-shaped set of scars right here. There's some
16 others that appear over here to a lesser extent, and
17 there's some at the very bottom. Those represent
18 pull-boat scars from the cypress logging operations.

19 So the oil and gas operations reused some of
20 those canals and dredged them wider and deeper and then
21 began extending them further.

22 You can also clearly see a distinct line that
23 represents the edge of the forest. And out here you
24 can see the upper end, upper area where you can see the
25 marsh. And in fact, on this aerial photo, you can see

1 areas of extensive burning. This is probably from a
2 marsh fire.

3 So, you know, those are some of the things
4 that are very obvious.

5 You can also see a ridge. This is referred
6 to as Love Ridge, which is a crevasse channel, a
7 natural levee.

8 And you can see this area is under
9 cultivation or pasture; and it developed, extended up
10 into a portion of the property involved in this
11 dispute.

12 But most important thing to me is that you
13 can clearly see the area, the line, demarcation line
14 between the forested area and the marsh.

15 Q. You mentioned logging operations. By your
16 best guess, when did those operations cease in this
17 area?

18 A. Oh, probably no later than 1920 or so.

19 I'm not sure of the exact time. But the
20 period of industrial cypress logging was between about
21 1880 and 1930. That's the height of the logging
22 period. So it would have been in that period.

23 Q. So this is 20, 30 years after the logging
24 operation; is that right?

25 A. Yes.

1 Q. Do you know when the oil and gas operations
2 started on the property?

3 A. In the 1930S. I don't recall the exact date,
4 but it was in the 1930s.

5 Q. Soon thereafter the inception of the oil and
6 gas operations?

7 A. Yes.

8 Q. Okay. Let's go to the next one if we can,
9 should be 1953.

10 And I'm going to ask you to tell me what that
11 photo tells you about the property.

12 A. That's a blow-up of 41.

13 MR. ARNOLD: One more, please. Thanks.

14 A. In 1953, you can again see marsh areas. You
15 can see the forested wetland area, canal system. There
16 may have been some extension to some canals, some
17 additional oil wells that began to appear between '41
18 and '53.

19 If you go to the next slide and zoom in.

20 This is the primary tank battery area
21 (indicating). You can see forested area here. It's
22 beginning to thin out. There are openings in the
23 forest canopy that were not there in 1941.

24 In fact, there's a -- it's not in here -- but
25 there's a 1932 topographic quadrangle map that

1 indicates that the original boundary between the marsh
2 and the swamp was way up here (indicating), just south
3 of the canal. And so between 1932 and 1953 you can see
4 that the forested area has declined and is being
5 replaced by marsh.

6 Q. And you mentioned "the forested area." How
7 would you characterize that?

8 A. That would have been bottomland hardwoods, a
9 mixture of tree types: Cypress, of course. There
10 would have been some water tupelo. Other common
11 species such as red maple, green ash, and so on.

12 Q. And is that a pit feature that I see down on
13 the bottom left corner?

14 A. This (indicating)?

15 Q. Yes.

16 A. Yes, that's an oilfield pit.

17 Q. And that's within the forested area; is that
18 right?

19 A. Yes.

20 Q. Let fast-forward to twenty years. Let's go
21 to 1973.

22 Again, what does this tell you about the
23 nature of the property, condition of the property?

24 A. Well, there are some areas that have remained
25 the same. The forested areas -- as you can see, this

1 is all still forest; there's a lot of forest here.

2 But in the area to the east of the tank
3 battery area, there's an additional degradation of the
4 forest area and conversion to marsh. And in this
5 particular aerial photo, you can see open water.

6 If you go to the next slide, I think
7 there's --

8 This zooms in a little bit. And it's
9 difficult to see, but there's some little streaks that
10 run southwest and northeast right in here. Those
11 represent shadows of either dead or dying trees.

12 So this area right here, there are still
13 standing trees, but they are dead or dying.

14 This area up here, the trees are all gone.
15 And you can see that the forest boundary has shifted
16 either further to the south. It's way down here now
17 (indicating).

18 MR. ARNOLD: Could we back up one slide,
19 please.

20 Q. So this area was pretty continuous cypress
21 forest or bottomland hardwood forest as you call it;
22 right?

23 A. That's correct.

24 Q. And we can see the, what's been called or
25 characterized as a flotant marsh or flotant meadow

1 adjacent to the oil and gas facilities. Do you see
2 that?

3 A. Yes.

4 Q. Is that a pretty localized area?

5 A. Yes. That you do have -- most, most of this
6 area here is being converted to flotant marsh.

7 There is some area over here as well that has
8 also been -- the forest area has been converted to
9 marsh as well.

10 It doesn't go as far south in this area here
11 as it does in here.

12 Q. So from 1941 to '73, we had a fairly
13 continuous stand of timber in this area, with the
14 exception of the flotant meadow where we see a
15 localized shift in vegetation. Is that right?

16 A. Yes.

17 Q. And in your opinions for this case, you've
18 stated that -- you've rendered opinions on why, why you
19 have observed that shift in vegetation; is that right?

20 A. Yes.

21 Q. Can you share with us what your opinions are?
22 Why we're seeing that shift in vegetation?

23 MR. LAPEZE: Again, when he says "opinions,"
24 Tom, I just want to be sure for the record
25 that they are not expert opinions. They are

1 his factual opinions.

2 THE HEARING OFFICER: I'm going to let him
3 testify.

4 What I've said is, by education and
5 experience, I don't see the background as
6 including plant life, botany, et cetera. But
7 I'm going to allow him to testify.

8 And to the extent that this category of
9 characteristics of cypress trees, I'm going
10 to let him testify, but I don't consider it
11 and I've not accepted it as expert opinion
12 testimony.

13 MR. CASH: Mr. Balhoff, my position is there
14 is no lay opinion.

15 THE HEARING OFFICER: Let Mr. Lapeze make the
16 objection again.

17 MR. LAPEZE: Same statement that Mr. Cash was
18 going to make and I think I agree with it.
19 He can discuss --

20 THE HEARING OFFICER: Okay. Let me look at
21 the opinion question.

22 Okay. Ask the question again,
23 Mr. Arnold.

24 BY MR. ARNOLD:

25 Q. You've rendered certain opinions in your

1 expert report and in your deposition testimony about
2 the conditions, environmental conditions on this
3 property; correct?

4 A. Yes.

5 Q. And you've rendered -- in those opinions
6 you've talked about the shifts in vegetation types on
7 the property. Is that right?

8 A. Yes.

9 Q. And you've rendered opinions about the causes
10 or reasons for those shifts in vegetation, have you
11 not?

12 A. Yes.

13 Q. Okay. And all I'm asking you to do is to
14 share those with us again today.

15 THE HEARING OFFICER: So, okay.

16 MR. ARNOLD: And these are based on his
17 observations from the site, based on the
18 aerial photographs, based on the data from
19 other experts -- and we're going to get into
20 that. These are all based on factual
21 observations.

22 THE HEARING OFFICER: Okay. But he's not
23 going to express an opinion on the
24 characteristics of cypress trees. Or at
25 least it's not going to be an expert opinion

1 accepted on the characteristics of cypress
2 trees. That's been my ruling.

3 Go ahead.

4 BY MR. ARNOLD:

5 Q. Can you answer the question?

6 MR. LAPEZE: Well, Mr. Balhoff -- I apologize
7 to interrupt again -- he can discuss, as I
8 understand it, what he's observed on aerial
9 photos.

10 The next question, the question on the
11 table is: Why? Why did he see these
12 changes?

13 And I believe he does not have the
14 expertise to recognize why we see changes to
15 cypress trees.

16 THE HEARING OFFICER: I agree with that
17 objection.

18 He has testified about the shift in
19 vegetation based on these aerial photographs.
20 He has been accepted in that area.

21 And so, with respect to -- I want to
22 hear a specific question that you intend to
23 ask him about opinions. I don't want to ask
24 an open ended and have him testify about
25 what's going to be causation on what happened

1 to cypress trees.

2 MR. ARNOLD: Okay. Well, let me proceed to
3 the next slide and maybe we can work through
4 that, if that's all right.

5 One more, please.

6 THE HEARING OFFICER: I'll tell you, let's
7 take a midmorning break right now for 15
8 minutes and then we'll visit with both
9 counsel.

10 (Brief recess taken.)

11 THE HEARING OFFICER: Okay. Back on the
12 record.

13 Mr. Castille is not going to offer
14 opinions with respect to, as I've already
15 stated, characteristics of cypress trees.
16 But I know a question came up about going
17 into causation of changes and the shift based
18 on the aerial map in the plant life.

19 He cannot testify, offer any opinion
20 testimony as to causation as to that or
21 specifically as to cypress trees.

22 He can testify about his lay
23 observations. He can't offer opinion
24 testimony on causation.

25 That's my ruling. And I've spoken with

1 the panel and they are -- that's their, also
2 their decision.

3 MR. ARNOLD: I just wanted to note my
4 objection for the record.

5 Based on his experience and education
6 and training, and the fact that he's been
7 accepted in a court of law as an expert in
8 these issues, I think he should be allowed to
9 testify as an expert in this proceeding. But
10 I just want to note my objection.

11 I understand your ruling.

12 THE HEARING OFFICER: He doesn't have, as I
13 understood his testimony, any education,
14 educational background in plant life, botany
15 or any related type field. He doesn't have
16 experience in those areas other than what
17 he's testified about. It's just litigation
18 in bottomland cases and legacy cases.

19 So he doesn't have the education and
20 experience, and that's the reason for my
21 ruling.

22 MR. ARNOLD: I understand. I'm not trying to
23 argue with you. But I just want to make the
24 point: As a geographer, he is trained, his
25 formal education and his training, is to look

1 at impact on the landscape, and that's
2 exactly what we're looking at here.

3 And again, I just want to make that
4 objection noted.

5 And I understand the ruling.

6 THE HEARING OFFICER: Okay. I understand
7 your objection.

8 Proceed.

9 BY MR. ARNOLD:

10 Q. Dr. Castille, did you look at work that was
11 conducted by other experts in this case?

12 A. Yes.

13 Q. Can you give us the next slide, please.
14 Do you recognize this figure? Do you
15 recognize this figure, this map?

16 A. Yes. That's one of the maps that was
17 compiled by ICON.

18 Q. Okay. And what does this map portray?

19 A. It indicates areas of high salinity within
20 the property.

21 Q. Okay. And that's depicted by this yellow
22 plume; is that right?

23 A. That's correct.

24 Q. Okay. Now does this yellow area correlate to
25 the property, the flotant meadow that we were looking

1 at before on the other aerial entry?

2 A. Yes, particularly the upper end.

3 Q. So those two areas overlap; is that right?

4 A. That's correct.

5 Q. Oh, let's go one more please.

6 And this is just another figure prepared by
7 ICON showing something similar, just at a deeper depth;
8 is that correct?

9 A. Yes. In this one the area of high salinity
10 correlates even more so with the flotant marsh area
11 east of the tank battery.

12 Q. Now, you did some fieldwork on this property;
13 is that right?

14 A. Yes.

15 Q. Did that include observations of cypress
16 roots, cypress tree roots?

17 A. Yes.

18 MR. ARNOLD: May I have the next slide,
19 please.

20 Q. What did you find about the depth of those
21 trees?

22 A. Well, the -- this particular exercise, this
23 was a part of the supplemental report that I
24 coauthored. And we investigated several observation
25 areas that were visited by the defendant's experts in

1 areas where -- most of them were areas where cypress
2 occurred. And so we revisited those spots and made
3 observations on the vegetation at those particular
4 sites.

5 And we did some limited excavation, some
6 probing, to try to determine the depths of the roots in
7 particular for cypress at those locations.

8 Q. And how far did those roots extend in the
9 soil?

10 A. Well, we couldn't tell for sure. The area
11 was flooded at the time. It was a high-water period.

12 But we did probe and did find roots down at
13 least three feet deep, which indicates that the roots
14 were extending into the mineral soils which occurred on
15 the property.

16 And one of the reasons for this particular
17 exercise was the claim that was being made, that the
18 roots for the trees growing on the property did not
19 extend very deep into the ground, and that was one of
20 the arguments being made for why it shouldn't be
21 cleaned up, why the salt shouldn't be cleaned up,
22 because the roots don't extend very deep in the ground.

23 And I was very skeptical of that. And so we
24 examined some of the same trees that the defendant
25 experts did and found that the roots did indeed extend

1 into the mineral soil beneath ground.

2 Q. You said at least three feet. Does that mean
3 that they extend further than that?

4 A. Oh yes. Much more.

5 I mean -- can I talk about cypress roots?

6 Q. Well, based on your observations in the field
7 and your observations that you have made in the past in
8 your work, how far did the cypress trees extend?

9 A. Many feet into the ground.

10 MR. LAPEZE: Mr. Balhoff, point of
11 clarification.

12 To the extent he's going to talk about
13 what he saw in this field, the cypress roots
14 here, that's fine. Based on the ruling, he
15 can do that.

16 But to the extent he's trying to
17 extrapolate that into some other opinion,
18 that's --

19 THE HEARING OFFICER: I sustain that
20 objection.

21 He's talking about an observation at one
22 location, and he is not an expert and he
23 can't extrapolate what he's talking about
24 with this observation.

25 If he's got multiple observations, he

1 can testify about those other observations.

2 BY MR. ARNOLD:

3 Q. How many sites did you visit on the property,
4 including the subject sites?

5 A. Four.

6 Q. And at each of these locations, what did you
7 find about the root depths?

8 A. The roots for the cypress that we observed
9 extended into the mineral soils beneath the organic
10 layer in all the sites that we examined.

11 Q. Now, would it be fair to say in the past that
12 the trees tell a story? They don't lie? Is that
13 correct?

14 A. Yes.

15 Q. And you made observations at this site about
16 the hydrological conditions based on the trees'
17 morphological conditions. Is that correct?

18 A. Yes.

19 Q. And what did you find on this site which led
20 you --

21 Well, let me just ask: What did you find on
22 this site related to the trees and their, the related
23 hydrological conditions?

24 A. Well, there --

25 MR. LAPEZE: Objection.

1 THE HEARING OFFICER: Sustained, on the basis
2 that he doesn't have the training and
3 education -- education and training.

4 BY MR. ARNOLD:

5 Q. Did you see cypress knees on this property?

6 A. Yes. And saplings and seedlings on the
7 property.

8 Q. You visited what has been termed the "Diamond
9 Swamp"; is that correct?

10 A. Yes.

11 MR. LAPEZE: I would like to make an
12 objection and just make sure the record is
13 clear.

14 What they are referring to as the
15 Diamond Swamp, for the purposes of the panel,
16 it's outside the 220 acres that's the subject
17 of the limited admission.

18 THE HEARING OFFICER: Okay. So what's the
19 purpose of the question then?

20 MR. ARNOLD: Well, the purpose of the
21 question is, first of all, what they have
22 submitted in their plan clearly talks about
23 the Diamond Swamp. It's part of their
24 analysis. So I'm going to ask him about what
25 he saw in the Diamond Swamp as it relates to

1 the subject of this admission.

2 THE HEARING OFFICER: I think the Diamond
3 Swamp was referred to in maybe Dr. Koob's
4 materials and maybe others, I don't know.
5 But they have stated at the outset, the
6 expert reports in the past were not intended
7 for purpose other than for the site at issue.

8 Is that correct?

9 MR. LAPEZE: Correct.

10 THE HEARING OFFICER: So that's my
11 understanding.

12 So I'm going to sustain the objection if
13 this deals with other than the site that's
14 involved with the limited admission.

15 BY MR. ARNOLD:

16 Q. Did you -- Dr. Castille, did you visit areas
17 outside of, outside of this --

18 MR. ARNOLD: I'm sorry. Let me go back to
19 the slide that shows the ICON figure, please.

20 I'm sorry. Go back.

21 Thank you.

22 Q. Did you visit areas within the 220 acres
23 outside this plume area?

24 A. Yes.

25 Q. And you observed cypress trees in those

1 areas?

2 A. Yes.

3 Q. Okay. And they were reproducing; is that
4 correct?

5 A. Yes.

6 Q. Did you see any other types of tree species
7 in those areas?

8 A. Yes. Typical bottomland hardwood species.

9 Q. Now, based on your interpretation of the
10 aerial photographs, you've made an assessment about the
11 historical use of the property?

12 A. Yes.

13 Q. What assessment did you make about the
14 historical uses of the property?

15 A. For the entire property or just this
16 200 acres?

17 Q. Well, I guess just the 220 acres.

18 A. This particular area is obviously used for
19 oil and gas production, but it's also used for
20 recreational purposes. There's a lot of hunting that
21 goes on and, to a limited extent, fishing.

22 Q. In a similar question, what about the
23 existing uses? You made an assessment about that based
24 on aerial photos and your site observations; is that
25 right?

1 A. The existing use?

2 Q. Existing use.

3 A. Yes. Historical and existing, both
4 hunting -- hunting is a predominant activity in this
5 area.

6 MR. ARNOLD: Okay. That's all the questions
7 I have for you. Thank you.

8 MR. LAPEZE: We have no questions.

9 THE HEARING OFFICER: No questions? Okay.

10 Mr. Castille, thank you.

11 Oh, I apologize. I apologize.

12 MR. CAMPBELL: No questions.

13 MS. LOVE: No questions.

14 MR. PENNINGTON: No questions.

15 THE HEARING OFFICER: You're free to go,
16 Dr. Castille. Thank you.

17 (Witness excused.)

18 THE HEARING OFFICER: Do you have any other
19 witnesses?

20 MR. CASH: Not today.

21 THE HEARING OFFICER: Okay. So Monday, who
22 is -- you're kind of in the back of your
23 case, so ...

24 MR. CASH: We will call Mr. Millner --
25 Dr. Millner, and he will be very brief. Not

1 much longer than what we just had.
2 THE HEARING OFFICER: Is that your last
3 witness?
4 MR. CASH: That is it, yes, sir.
5 THE HEARING OFFICER: Okay. And then,
6 Mr. Jones?
7 MR. HUDDALL: We'll call Mr. Miller.
8 THE HEARING OFFICER: Mr. Miller?
9 MR. HUDDALL: Yes.
10 THE HEARING OFFICER: Will he be the only
11 witness?
12 MR. ARNOLD: Possibly Dr. Rogers, Jim Rogers.
13 THE HEARING OFFICER: Jim Rogers? Got that.
14 Okay. So 8:30 on Monday?
15 MR. JONES: We might finish Monday.
16 MR. CASH: I think there's a good chance.
17 MR. JONES: Might finish Monday.
18 MR. CASH: Certainly no later than Tuesday.
19 THE HEARING OFFICER: Okay. Great. Thank
20 you.
21 (Whereupon the proceedings recessed at
22 10:37 AM.)

23 * * *
24
25

REPORTER'S CERTIFICATE

I, ESTELLA O. CHAMPION, Certified Court Reporter and Registered Professional Reporter in and for the State of Louisiana, and as the officer before whom this testimony was taken, do hereby certify that the foregoing proceedings before the Department of Natural Resources, Volume 1, reported on November 11, 2015m transpired as hereinabove set forth in the foregoing 92 pages.

I further certify that said proceeding was reported by me in the Stenotype reporting method, was prepared and transcribed by me or under my personal direction and supervision, and is a true and correct transcript to the best of my ability and understanding.

I further certify that the transcript has been prepared in compliance with transcript format guidelines required by statute or by rules of the board, that I have acted in compliance with the prohibition on contractual relationships as defined by Louisiana Code of Civil Procedure, Article 1434, and in rules and advisory opinions of the board.

I further certify that I am not an attorney or counsel for any of the parties, that I am neither related to nor employed by any attorney or counsel connected with this action and that I have no financial interest in the outcome of this matter.

This certificate is valid only for this transcript accompanied by my original signature and original required seal on this page.

Baton Rouge, Louisiana, this 3rd day of December, 2015.

ESTELLA O. CHAMPION, CCR, CRR
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